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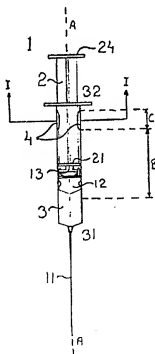
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(54) Title: A NON-REUSABLE SYRINGE ARRANGEMENT

(57) Abstract

The invention consists of a non-reusable syringe (1) that includes a rod (2) that is capable of reciprocating forward and backward relative to a container (3) whose one end (31) consists of, or can interact with, a needle (11), and whose opposite end (32) is open; a piston (12) that can interact with the end of the rod that protrudes into the container; a means (13) for connecting and disconnecting the piston from the end of the rod; at least two guide and glide surfaces (22a, 22b) that have a longitudinal orientation along the edges of the rod. Said means (13) for connecting and disconnecting the piston from the rod is made up of an abutment (21) on the end of the rod that extends towards the needle, which abutment belongs to the support and/or glide surfaces that are arranged to interact with corresponding support and glide surfaces on the piston (12). Rotation of said rod (2) is prevented by a means of control (4) in the container. Said means of control (4) is made up of at least two embossments in an external surface of said container's jacket. Each embossment forms a guide and glide surface in the inner surface of said container's jacket. The guide and glide surfaces of said rod are arranged to run towards, or adjacent and relative to, the guide and glide surfaces of said container.



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A non-reusable syringe arrangement

TECHNICAL FIELD

- 10 The present invention relates to a hypodermic syringe. More particularly, it relates to a non-reusable syringe whose embodiment includes a rod that is designed to be capable of reciprocating forward and backward relative to a container whose one end consists of, or can interact with, a needle, and
- 15 whose opposite end is open; a piston that interacts with the end of the rod that protrudes into the container; a means for connecting and disconnecting the piston from the end of the rod; at least two guide and glide surfaces, having a longitudinal orientation along the edges of the rod.

- 20 The aim of the present invention is to offer a non-reusable syringe, which means that a liquid that is meant to be injected may be drawn into the container via the needle, after which the enclosed liquid can be emptied from the container
- 25 via the needle, whereafter the syringe may not be used again for filling and emptying.

- In particular, the present invention relates to a syringe whose means for connecting and disconnecting the piston with
- 30 the rod enters a connecting state when the piston of the rod is drawn from a position in the immediate proximity of the needle to a remote position, relative to the needle, and is brought to a disconnecting or disconnected state when the piston of the rod is pressed towards the needle. The means for
- 35 connecting and disconnecting the piston from the rod is made up of an abutment on the end of the rod that protrudes towards the needle, which abutment belongs to the support and/or glide surfaces that are designed to interact with corresponding support and glide surfaces on the piston while the rod is

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prevented from rotating about a central axis that is common to the rod and the container, through means of control, belonging to the container, that prevents said rod from rotating.

5 BACKGROUND ART

Given their properties, non-reusable syringes of the kind described above, may be divided into a number of categories of function.

10

A first category can be exemplified by a hypodermic syringe whose ingoing rod is designed to be rotated relative to the container and the piston, so that on the one hand, by means of the rotating rod, a connecting and disconnecting means can enter into a connecting position or state, whereas on the other hand the means can enter a disconnecting or disconnected position or state. The conditions for this category of syringes requires the piston not to twist, or at least not while the rod rotates relative to the container.

20

Thus, for this category of non-reusable syringes, it is extremely significant that measures be taken to ensure that the piston fulfils this condition.

- 25 A second category of non-reusable syringes makes use of a forward and backward reciprocating rod or rod unit that does not rotate in the container, and a piston or piston unit that is attached to the rod. The external surface of the piston and the internal surface of the container are equipped with an interacting organ that, in an interacting state, locks the piston in a bottom position.

- A third category of non-reusable syringes makes use of a forward and backward reciprocating rod unit that does not rotate in the container, and a piston unit that is attached to the rod unit via a special binding part.

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The binding part is here rotatably connected to the rod, where a rotation about a centre line that is common to the rod, the piston, and the container, may be regulated by tracks in the piston unit.

5

In summary, it can be said that certain categories of non-reusable syringes require that the rod be prevented from rotating about a centre line that is common to the container, the rod and the piston.

10

While this requirement may be fulfilled in various ways, the most common way is to equip the container with a cover at the opposite end of the needle, and to give the cover regulating tracks along which said rod may glide. A cover of this kind represents an additional detail for the syringe that must be produced and assembled, which implies extra costs for materials and production.

15

When producing the container of the syringe, another way to prevent the rod from rotating is to cast or fasten parts in the container that forms tracks on the inside of the container. These tracks may be used in different ways to control or regulate the rod's ability to rotate or twist inside the container.

20

SUMMARY OF THE INVENTION

TECHNICAL PROBLEMS

30 Given the background art as it has been described above, and given the considerable efforts that are being expended to design a non-reusable syringe that is well-suited for mass production, and whose manufacturing costs are on a par with the cost of producing ordinary reusable syringes, it ought to be considered a qualified technical problem to be able to create, by simple means, conditions whereby the rod may move solely in a linear direction without rotating about a centre

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line that is common to the rod, the container and the piston.

Another technical problem is in being able to realise how these conditions may be provided without having to add, for that specific purpose, details that require additional materials to the design of the syringe.

Another technical problem is in being able to realise how the guide and glide surfaces can be created on the rod.

10

Another technical problem is in realising how, by simple means, corresponding guide and glide surfaces can be created in the container's inner jacket surface, arranged to run against said guide and glide surfaces of the rod.

15

Still another technical problem is in realising how the guide and glide surfaces created in said container ought to be positioned in order to interact with said guide and glide surfaces of the rod, thereby preventing a rotation about the centre line that is common to the rod and the container when the rod reciprocates forward and backward, relative to the container.

20

Another technical problem is in being able to realise which available guide and glide surfaces may be used on the rod, should the rod be made up in part of two wings, such as the wings of intersecting planes.

25

Given a rod as described above, another technical problem is in being able to realise that solely two guide and glide surfaces on the rod and in the container respectively are sufficient for preventing the rod from rotating.

30

Another technical problem is in being able to realise how these two guide and glide surfaces need to be positioned on the rod and in the container, in order to prevent the rod from rotating.

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- 5 -

Another technical problem is in being able to realise which possible production techniques and simplifications might be provided by using four guide and glide surfaces on the rod and in the container respectively, as well as how these need to be
5 positioned relative to one another in order to obtain the desired simplification.

Another technical problem is in being able to realise the significance of positioning the guide and glide surfaces of
10 the container close to the container's open end.

Yet another technical problem is in being able to realise how long the guide and glide surfaces of the container need to be in order to permit an effective method of production.

15 Another technical problem is in being able to realise how opportunities may be provided for preventing the rod and its associated piston, or a means for connecting or disconnecting said piston, from being removed from the container so that the
20 piston and rod can be reconnected after it has been used, thereby ensuring that the syringe may only be used once.

SOLUTION

25 In order to solve one or more of the above technical problems, the present invention proceeds from a non-reusable syringe that includes a rod, designed to be capable of reciprocating forward and backward relative to a container whose one end consists of, or can interact with, a needle, and whose
30 opposite end is open; a piston that interacts with the end of the rod that protrudes into the container; a means for connecting and disconnecting the piston from the end of the rod; at least two guide and glide surfaces, having a longitudinal orientation along the edges of the rod.

35 The invention proceeds from and is based on the concept that said connecting and disconnecting means enters a connecting

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state when the piston of the rod is drawn from a position in the immediate proximity of the needle to a remote position, relative to the needle, and is brought into a disconnecting or disconnected state when the piston of the rod is pressed towards the needle. Said means for connecting or disconnecting the piston from the rod is made up of an abutment on the end of the rod that protrudes towards the needle, which abutment belongs to the support and/or support surfaces that are arranged to interact with corresponding support and/or glide surfaces on the piston. Moreover, the basis for the invention lies in the function of the connecting and disconnecting means, which requires that said rod be prevented from rotating about a central axis that is common to the rod and the container. Rotation is prevented by a means of control in the container.

Given a non-reusable syringe of this kind, the present invention shows that said means of control is made up in part by at least two embossments, or similar means, in an external surface of said container's jacket. Each embossment forms a guide and glide surface in the inner surface of said container's jacket. Moreover, the guide and glide surfaces of said rod are arranged to run adjacent to, or towards, the guide and glide surfaces of said container, thereby causing the rod to move in a linear manner relative to the container.

Said means of control is obtained during a given step in the production of the container and the syringe. However, this step does not require adding, or the use of, additional components or materials.

Further, it is shown that the proper positioning of said embossments, relative to the container, forms guide and glide surfaces that interact with the guide and glide surfaces of the rod, thereby preventing the rod from rotating about a central line that is common to the rod and the container, when the rod is reciprocates forward and backward relative to the

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container.

In an ordinary type of hypodermic syringe, the cross section of said rod is made up of wings, such as the wings of two
5 intersecting planes. The invention shows that guide and glide surfaces of said rod may consist of some said planes' or wings' peripheral edge surfaces.

Further, the invention shows that the guide and glide surfaces
10 of said rod need only be two in number, and that these should be situated on opposing edges of one of said planes, and on the same side of said plane.

In addition, the invention shows that if the rod is equipped
15 with guide and glide surfaces as described above, then the guide and glide surfaces in the container need only be two in number, preferably located on opposite sides of said container, immediately adjacent to, and on the same side as the guide and glide surfaces of said rod, in order to ensure
20 the desired linear movement.

The current invention also shows that the guide and glide surfaces of said rod may be two in number, and located on the same edge of one of said planes, and on opposite sides of said
25 plane.

Even in this case, the present invention shows that guide and glide surfaces of the container need only be two in number, located on the same side of said container, immediately
30 adjacent to, and on opposite sides of the planes--and their guide and glide surfaces--that belong to said rod, in order to ensure the desired linear movement.

Further, the invention shows that the guide and glide surfaces
35 of said rod may be four in number, located in pairs facing one another on opposing edges of one of said planes, and that the two guide and glide surfaces within each pair must be located

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facing each other on opposite sides of said planes.

In this case, the invention shows that the guide and glide surfaces of said container must also be four in number,
5 located in pairs that face one another on opposite sides of said container, and that the two guide and glide surfaces within each pair must be located immediately adjacent to, and on opposing sides of, the planes--and their guide and glide surfaces--that belong to said rod.

10

Moreover, the invention shows that the position of said means of control on said container is close to the open end of said container. The length of the guide and glide surfaces of said means of control is between eight and twelve millimetres,
15 preferably ten millimetres, so that, although they do not occupy more of the container than is necessary, they do nonetheless ensure a simple embossment whose results are lasting and whose guide and glide surfaces, which are formed from the embossment are adequately precise.

20

In addition, the present invention shows that the cross-section surface of said rod's abutment, which protrudes towards the needle, is slightly less than the cross-section surface of said container, thereby permitting said abutment to
25 pass freely into said container up to the point of the embossments. Thus, because the rod cannot be drawn past the embossments, it cannot be completely drawn out of said container.

30

ADVANTAGES

The prime advantage that can be associated with a non-reusable syringe, according to the present invention, is that a simple method is obtained for regulating and controlling that a rod
35 that belongs to the syringe cannot twist or be rotated about a centre line that is common to the container, the rod and the piston when the rod reciprocates forward and backward, rela-

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tive to the container, by simply forming the container, during the manufacturing process, with a number of embossments. The guide and glide surfaces, which are formed within the container, regulate or control that the rod does not rotate.

5

The primary characteristic features of a non-reusable syringe, according to the present invention, are set forth in the characterising clause of Claim 1.

10

BRIEF DESCRIPTION OF THE DRAWINGS

15

The currently proposed embodiment, which shows the characterising features of the present invention, will now be described in greater detail relative to the accompanying drawings, in which:

20

Figure 1 is a side view of a non-reusable syringe according to the present invention;

Figure 2 shows in perspective view, a rod that belongs to a non-reusable syringe;

25

Figure 3 is an enlarged cross-sectional view according to the line II-II in Figure 2;

Figure 4 is an enlarged cross-sectional view according to the line I-I in Figure 1;

30

Figure 5 is a cross-sectional view, according to Figure 4, of an alternative embodiment of the present invention;

35

Figure 6 is a cross-sectional view, according to Figure 4,

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of yet another alternative embodiment of the present invention;

- Figure 7 is a cross-sectional view of several possible cross sections of rods that can be used in a non-reusable syringe, according to the present invention.

DESCRIPTION OF EMBODIMENTS AT PRESENT PREFERRED

- Inasmuch as the present invention may be considered to have developed directly from the non-reusable syringe that is shown and described in the Swedish patent publication with application number 92 02423-1, references are made to that publication for a more detailed description of the internal design of the invention's internal parts as well as how they interact with one another.

- However, it must be understood that the present invention is not limited to that particular embodiment, but can be used whenever the purpose is to regulate, in a syringe, a rod's linear movement relative to the container.

- Figure 1 shows a non-reusable syringe 1, according to the present invention, that includes a rod 2, designed to be capable of reciprocating forward and backward relative to a container 3. The container's one end 31 consists of, or can interact with, a needle 11. The container's opposite end 32 is open. The syringe 1 also includes a piston 12 that interacts with the end of the rod that protrudes into the container, and a means 13 for connecting and disconnecting the piston from the end of the rod.

- Said means 13 for connecting and disconnecting the piston from the end of the rod enters a connecting state when the piston 12 of the rod 2 is drawn from a position in the immediate proximity of the needle 11 to a remote position, relative to the needle, and is brought into a disconnecting or disconnect-

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ted state when the piston 12 of the rod 2 is pressed towards the needle 11. Said means 13 for connecting and disconnecting the piston from the rod is made up of an abutment 21 on the end of the rod 2 that protrudes towards the needle 11, which
5 abutment belongs to the support and/or glide surfaces that are arranged to interact with corresponding support and/or glide surfaces on the piston 12. The above connecting and disconnecting function requires that said rod 2 be prevented from rotating about a central axis A that is common to the rod and the
10 container.

Because said connecting and disconnecting function is not an important function of the present invention, it will not be described in greater detail in this publication. Instead, the
15 present invention may serve as a means for obtaining a satisfactory function of previously described connecting and disconnecting means 13.

The present invention relates primarily to the container's 3
20 means of control 4, which prevents said rod 2 from rotating.

As shown in Figure 2, the that belongs to the syringe is generally made up in part of two intersecting wings or planes 22, 23. The end of the rod that faces into the container 3 ends
25 with a transverse section 21, and the opposite end ends with a thumb support 24.

The present invention shows that the rod 2 is equipped with at least two guide and glide surfaces that have a longitudinal
30 orientation along the edges or the rod.

The guide and glide surfaces of the rod, according to Figure 2, might be made up of the outer edge sections 22a, 22b on the wing or the plane, according to Figure 3.

35

Figure 4 shows that said means of control 4 consists of two embossments 41, 42 in an external surface 33 of said contain-

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ner's 3 jacket. Each embossment 41, 42 forms a guide and glide surface 41a, 42a in the inner surface 34 of said container's 3 jacket.

- 5 The guide and glide surfaces 22a, 22b of the rod 2 are arranged to run towards the guide and glide surfaces 41a, 42a of said container 3.

10 The present invention shows that the correct placement of said embossments creates guide and glide surfaces that can interact with the guide and glide surfaces of said rod, thereby preventing the rod from rotating about a central axis or line "A" that is common to the rod and the container, when the rod reciprocates forward and backward relative to the container.

15 In general, we can say that at least two guide and glide surfaces are required on the rod and in the container, and that the position of these surfaces must prevent the rod from rotating about a central line "A".

20 This requirement can be fulfilled in various ways. The purpose of the description that follows is to exemplify some embodiments that fulfil the requirement.

- 25 Figure 3 shows that a number of surfaces on the rod can be used as guide and glide surfaces. In particular, on the same side, but on opposing edges of plane 22 we see guide and glide surfaces 22a and 22b. Likewise, on the opposite side and on opposing edges of plane 22 we see guide and glide surfaces 22c and 22d. In this same way, the plane 23 can be said to contain
30 the guide and glide surfaces 23a, 23b, 23c and 23d.

Figure 4 shows an embodiment whose guide and glide surfaces 22a, 22b of the rod 2--which are located on the same side but
35 on opposing edges of one of the planes 22 of the rod 2--interact with the guide and glide surfaces 41a, 42a of the container--which are located on opposing sides of said container 3,

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immediately adjacent to, and on the same side of, said rod's 2 plane 22 and its guide and glide surfaces 22a, 22b.

In this embodiment, a clockwise rotation of the rod 2 is prevented by the two guide and glide surfaces 22b and 42a, where-
5 as a counter-clockwise rotation is prevented by the two guide and glide surfaces 22a and 41a.

Figure 5 shows an embodiment whose container 3 is equipped
10 with two embossments 41' and 43, which form guide and glide surfaces 41a' and 43a.

The guide and glide surfaces 22a, 22c of the rod 2, which are located on the same edge, but on opposing sides of one of the
15 rod's 2 planes 22, interact with the guide and glide surfaces 41a', 43 of the container, which are located on the same side of the container 3, immediately adjacent to, and on opposite sides of the rod's 2 plane 22 and its guide and glide surfaces 22a, 22c.

20

In this embodiment, a clockwise rotation of the rod 2 is prevented by the two guide and glide surfaces 22c and 43a, where-
as a counter-clockwise rotation is prevented by the two guide and glide surfaces 22a and 41a'.

25

Nothing prevents the use of more than two guide and glide surfaces on the container or the rod. Additional surfaces would make the guidance more stable, and might even simplify the actual embossment process.

30

Figure 6 shows an embodiment that has four guide and glide surfaces on the rod and in the container respectively.

Here we see that the guide and glide surfaces 22a, 22b, 22c,
35 22d of the rod are four in number, located in pairs (22a, 22c and 22b, 22d) facing each other on opposing edges of one of the rod's 2 planes 22, and that the two guide and glide sur-

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faces within each pair are located facing one another on opposite sides of said plane.

Corresponding guide and glide surfaces 41a'', 42a', 43a', 44a
5 in container 3, which are formed by four embossments 41'',
42', 43', 44, are located in pairs (42a'', 43a' and 42a', 44a)
facing each other on opposing sides of the container. The two
guide and glide surfaces within each pair are located immediately adjacent to, and on opposite sides of the rod's 2 plane
10 22 and its guide and glide surfaces 22a, 22b, 22c, 22d.

In this embodiment, a clockwise rotation of the rod 2 is prevented by the four guide and glide surfaces 22c, 43a', 22b, 42a', whereas a counter-clockwise rotation is prevented by the
15 four guide and glide surfaces 22a, 41a'', 22d, 44a.

Additional embossments can be made so that combinations of guide and glide surfaces of the container correspond to some of the guide and glide surfaces of the rod, as shown in Figure
20 3.

It is even conceivable that the rod 2 be formed in way not described here. What characterises a rod and can be used in the present invention are the wing-shaped projections that
25 proceed from the centre of the rod. These are necessary for creating at least two guide and glide surfaces. For example, in Figure 7, we see that a rod 7d may consist of a cylinder-like body 7d1 with a wing-shaped projection 7d2 that facilitates the guide and glide surfaces 7d2a and 7d2b. The other
30 examples, 7a, 7b, 7c show a cross section of rods, all of which facilitate several possible guide and glide surfaces.

The task of reporting every possible combination of embossments and types of rods that could facilitate a rod's desired
35 linear movement would be too comprehensive for this publication. Thus, it should be understood that the combinations described above represent only a few exemplifying embodiments,

- 15 -

all of which fall within the scope of the inventive thought.

- Figure 1 shows that the sectional area of the rod's 2 abutment 21, at the end of the rod that extends towards the needle 11, is designed to be slightly less than the sectional area of the container 3. Thus, the rod 2 and its transverse end section 21 can run freely within said container 3 up to the point of the means of control 4, which are made up of embossments in the external surface 33 of the container's 3 jacket. This design gives the container 3 a locally-related reduced sectional area, which in turn means that the section 21 cannot pass this area, thereby preventing the rod 2 from being completely drawn out of the container 3.
- Figure 1 also shows that the position on the container of said means of control 4 is close to the container's open end 32, in order to give the rod 2 the greatest amount of stroke "B" within the container 3.
- The guide and glide surfaces of said means of control are allocated a length "C" that is between eight and twelve millimetres, preferably ten millimetres. The length "C" should not be longer than this, otherwise it would limit the rod's stroke "B" in the container 3. Neither should the length be shorter than prescribed above; otherwise the guide and glide surface for the rod 2 may not provide adequate stability and control.

The embossments described above are formed of extruder core that presses the container material in towards the edge or edges of the rod's planes or wings. In cases where the container is allocated two guide and glide surfaces that affect opposing sides of the rod's planes (Figures 5 and 6), said planes can function as a buckler during the embossment. The recoiling properties of the container's material create the gap that is needed between the various guide and glide surfaces to obtain a free movement of the rod.

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Obviously, the invention is not limited to the above illustrated exemplifying embodiments, but may be modified within the scope of inventive thought as illustrated in the following claims.

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CLAIMS

1. A non-reusable syringe (1), that includes a rod (2), arranged to be capable of reciprocating forward and backward relative to a container (3) whose one end (31) consists of, or can interact with, a needle (11), and whose opposite end (32) is open; a piston (12) that interacts with the end of the rod that protrudes into the container, where a means (13) for connecting and disconnecting the piston from the end of the rod; at least two guide and glide surfaces (22a, 22b) that have a longitudinal orientation along the edges of the rod; said means (13) for connecting and disconnecting the piston from the end of the rod enters a connecting state when the piston (12) of the rod (2) is drawn from a position in the immediate proximity of the needle (11) to a remote position, relative to the needle, and is brought into a disconnecting or disconnected state when the piston of the rod is pressed towards the needle; said means for connecting and disconnecting the piston from the rod is made up of an abutment (21) on the end of the rod that extends towards the needle, which abutment belongs to the support and/or glide surfaces that are arranged to interact with corresponding support and glide surfaces on the piston (12) while the rod is prevented from rotating about a central axis (A) that is common to the rod and the container through means of control (4), belonging to the container, that prevents said rod from rotating, characterised in that said means of control (4) is made up of at least two embossments (41, 42) in an external surface (33) of said container's (3) jacket; that each embossment (41, 42) forms a guide and glide surface (41a, 42a) in the inner surface (34) of said container's jacket; and that the guide and glide surfaces (22a, 22b) of said rod (2) are arranged to run towards, or adjacent and relative to, the guide and glide surfaces (41a, 41b) of said container.
2. A syringe according to Claim 1, characterised in that the position of said embossments (41, 42), relative to

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the container (3) creates guide and glide surfaces that can interact with the guide and glide surfaces (22a, 22b) of the rod, thereby preventing the rod from rotating about a central axis (A) that is common to the rod (2) and the container (3)
5 when the rod is reciprocated forward and backward relative to the container.

3. A syringe according to Claim 1, characterised in that said rod (2) is made up in part of two intersecting wings
10 or planes (22, 23), and that said rod's guide and glide surfaces are made up of some of said planes' peripheral edge surfaces.

4. A syringe according to Claim 1 or 3, characterised
15 in that the guide and glide surfaces (22a, 22b) of said rod (2) are two in number, preferably located on opposite edges, but on the same side, of one of said planes (22).

5. A syringe according to Claim 4, characterised in
20 that the guide and glide surfaces (41a, 41b) of said container (3) are two in number, preferably located on opposite sides of said container, immediately adjacent to, and to the side of, said rod's (2) plane (22) and its guide and glide surfaces (22a, 22b).

25 6. A syringe according to Claim 1 or 3, characterised in that the guide and glide surfaces (22a, 22c) of said rod (2) are two in number, preferably located on the same edge of one of said planes (22) and on opposite sides of said plane
30 (22).

7. A syringe according to Claim 6, characterised in that the guide and glide surfaces (41a', 43) of said container
35 (3) are two in number, preferably located on the same side of said container (3) immediately adjacent to, and on opposite sides of, said rod's (2) plane (22) and its guide and glide surfaces (22a, 22c).

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8. A syringe according to Claim 1 or 3, characterised in that the guide and glide surfaces (22a, 22b, 22c, 22d) of said rod (2) are four in number, preferably located in pairs facing each other on opposite edges of one of said planes
5 (22), and that the two guide and glide surfaces within each pair face one another on opposite sides of said plane (22).

9. A syringe according to Claim 8, characterised in that the guide and glide surfaces (41a', 42a', 43a', 44) of said
10 container (3) are four in number, preferably located in pairs facing each other on opposite sides of said container (3), and that the two guide and glide surfaces within each pair are located immediately adjacent to, and on opposite sides of, said rod's (2) plane (22) and its guide and glide surfaces
15 (22a, 22b, 22c, 22d).

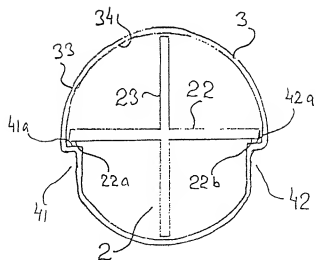
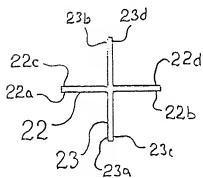
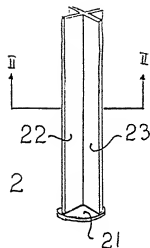
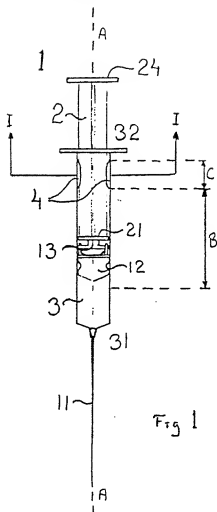
10. A syringe according to Claim 1, characterised in that the position of the means of control (4) on said container (3) is close to the open end (32) of said container.

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11. A syringe according to Claim 1, characterised in that the length (C) of said means of control's (4) guide and glide surfaces is between eight and twelve millimetres, preferably ten millimetres.

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12. A syringe according to Claim 1, characterised in that the sectional area of said rod's (2) abutment (21), at the end of the rod that extends towards the needle (11), is slightly less than the sectional area of said container (3),
30 thereby permitting said abutment (21) to pass freely within said container (3), but not past said means of control (4).



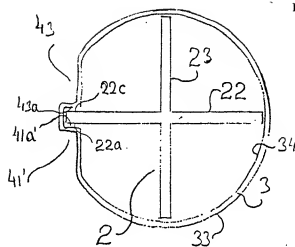


Fig 5

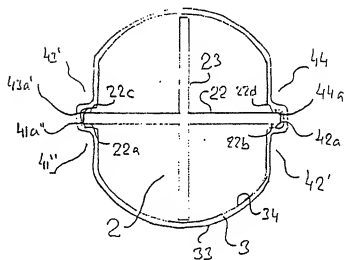


Fig 6

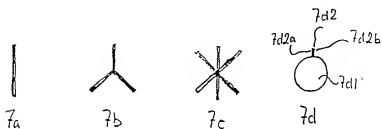


Fig 7

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 96/00967

A. CLASSIFICATION OF SUBJECT MATTER

IPC6: A61M 5/315, A61M 5/50

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC6: A61M

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 9404208 A1 (HELLDIN, NILS, GÖRAN), 3 March 1994 (03.03.94), figure 1, abstract -----	1-12

☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

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| <p>* Special categories of cited documents:</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"B" earlier document but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> | <p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone</p> <p>"Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art</p> <p>"&" document member of the same patent family</p> |
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Date of the actual completion of the international search

Date of mailing of the international search report

21 October 1996

24 -10- 1996

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INTERNATIONAL SEARCH REPORT
Information on patent family members

01/10/96

International application No.

PCT/SE 96/00967

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO-A1- 9404208	03/03/94	AU-B- 671488	29/08/96
		AU-A- 4989493	15/03/94
		CA-A- 2143309	03/03/94
		EP-A- 0656793	14/06/95
		JP-T- 8500499	23/01/96
		SE-B, C- 469742	06/09/93
		SE-A- 9202423	06/09/93
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